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John C. Jones
ATTORNEY FOR APPLICANT

October 7, 1999
DATE OF SIGNATURE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of)
Rene Langhans) Group Art Unit: 3724
on ROTARY CUTTING UNIT)
Serial No.: 883,685 / 08/612,212)
Filed: March 6, 1996) (Our Docket No. 2821-193)

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Hartford, Connecticut, October 7, 1999

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PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT
UNDER 37 CFR 1.8(b)

Sir:

A notice of October 1, 1999 indicates that Applicant failed to respond to the Office Action of March 1, 1999. Accordingly, the Patent Office asserts that the above-identified application became abandoned for failure to file a timely and proper reply.

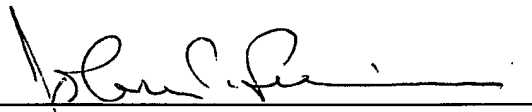
APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION

The required reply was previously filed with a Notice to Official Draftsman on July 30, 1999, and included a Request for Extension of Time and a check for the required fee covering a two-month time extension. The cancelled check indicates receipt by the Patent and Trademark Office at least by August 4, 1999. Each of these documents, copies of which are included herein, included a signed certification under 37 C.F.R. §1.8 indicating that they were deposited timely in first class mail on July 30, 1999.

A new set of red marked drawings of Figs. 1 and 2 has been included for the convenience of the Official Draftsman.

Applicant believes that no fee is required to revive the application at this time, however please charge our Deposit Account No. 13-0235 in the event a fee is required.

Respectfully submitted,

By 
John C. Linderman
Registration No. 24,420
Attorney for Applicant

McCORMICK, PAULDING & HUBER
CityPlace II
185 Asylum Street
Hartford, CT 06103-4102
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Memo: 2821-193 two month extension

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Ser./Pat/TM No. 08/1612, 212

File No. 2821-193

Name Renee Langhans

DMS/GB

Hon. Commissioner of Patents

Sir:

Please acknowledge receipt of this paper by stamping the date received in the space indicated and returning this card to the addressee.

Respectfully,

McCormick, Paulding & Huber

✓ Figs 4, 2 + proposed new fig

☐ Application -

☒ Amendment

☐ Final Fee

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[Signature]
ATTORNEY FOR APPLICANT

July 30, 1999
DATE OF SIGNATURE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of)
Rene Langhans) Group Art Unit: 3724
on ROTARY CUTTING UNIT)
Serial No.: 08/612,212)
Filed: March 6, 1996) (Our Docket No. 2821-193)

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Hartford, Connecticut, July 30, 1999

Hon. Assistant Secretary and Commissioner
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REQUEST FOR EXTENSION OF TIME

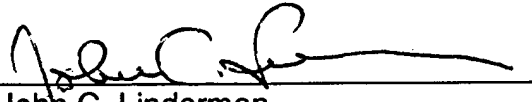
Sir:

Applicant hereby petitions for a two-month extension of time in order to file an Amendment and Response to the Office Action dated March 1, 1999 in the above-identified application. The fee of \$380.00 required under 37 CFR 1.17(a)(2) is enclosed.

If any additional extension of time for the accompanying response is required, applicant requests that this paper be considered a petition therefor.

The Commissioner is authorized to charge any fees under 37 CFR
1.17(a)(1) to 1.17(a)(5), which may be required to Deposit Account No. 13-0235.

Respectfully submitted,

By 
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Memo: 2821-193 two month extension

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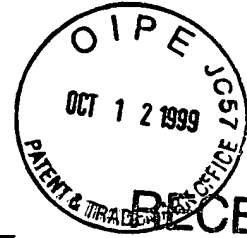
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Group 3700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of)
Rene Langhans) Group Art Unit; 3724
on ROTARY CUTTING UNIT)
Serial No.: 08/612,212)
Filed: March 6, 1996) (Our Docket No. 2821-193)

Hartford, Connecticut, July 30, 1999

Box OFFICIAL DRAFTSMAN
Assistant Commissioner for Patents
Washington, D.C. 20231

LETTER TO OFFICIAL DRAFTSMAN

Sir:

In response to paragraph 4 - 6 of the Office Action dated March 1, 1999, revised informal Figures 1 and 5 are enclosed which identify angle α and switch the references to components 26 and 27. The labeling for drive unit 30 has been changed by adding the word "detachable." The changes are marked in red.

In addition, a proposed new figure is included for review by the Examiner

and possible addition to the application at a later date. No new matter has been added to the drawings by this revision.

Respectfully submitted,

By



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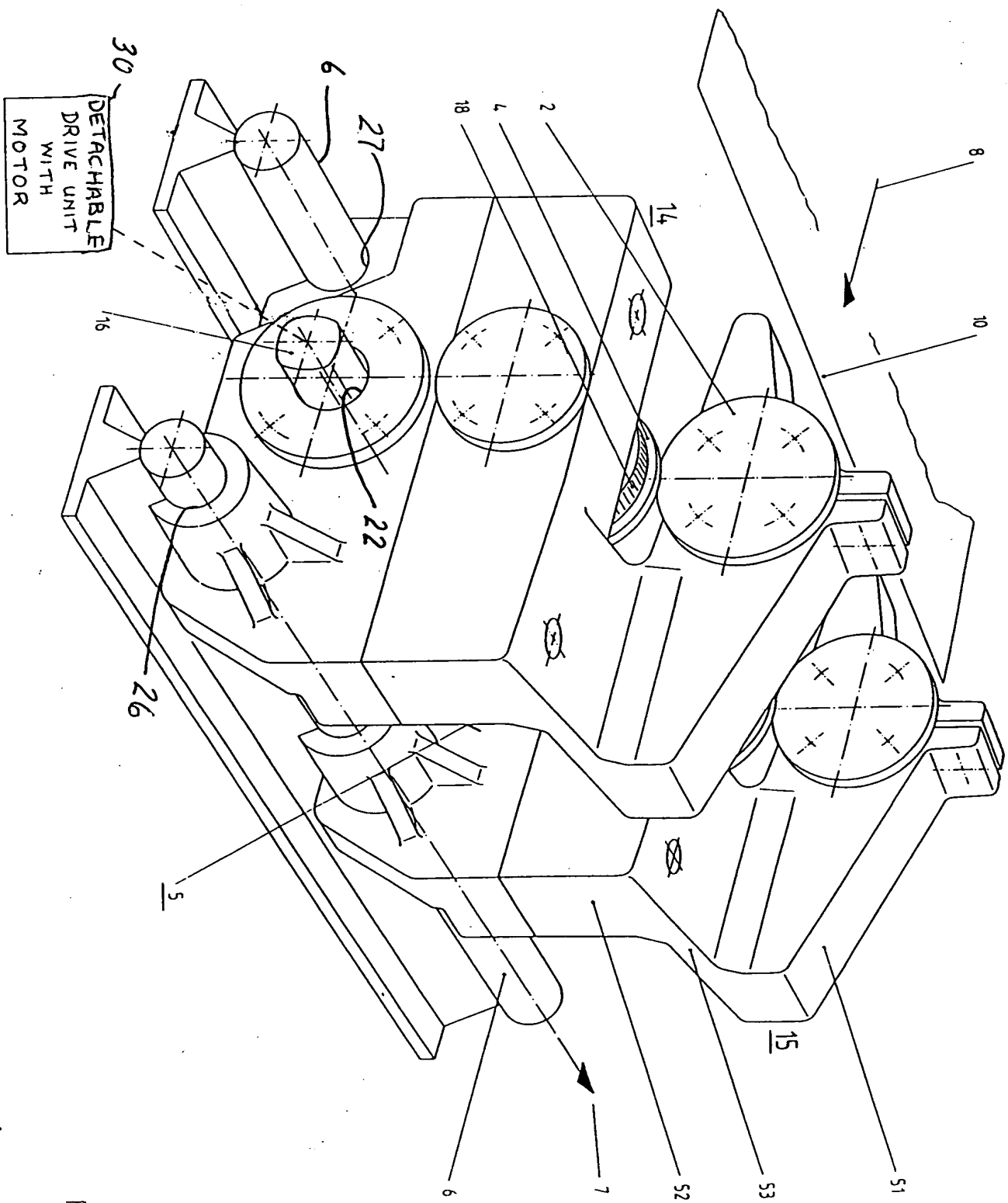
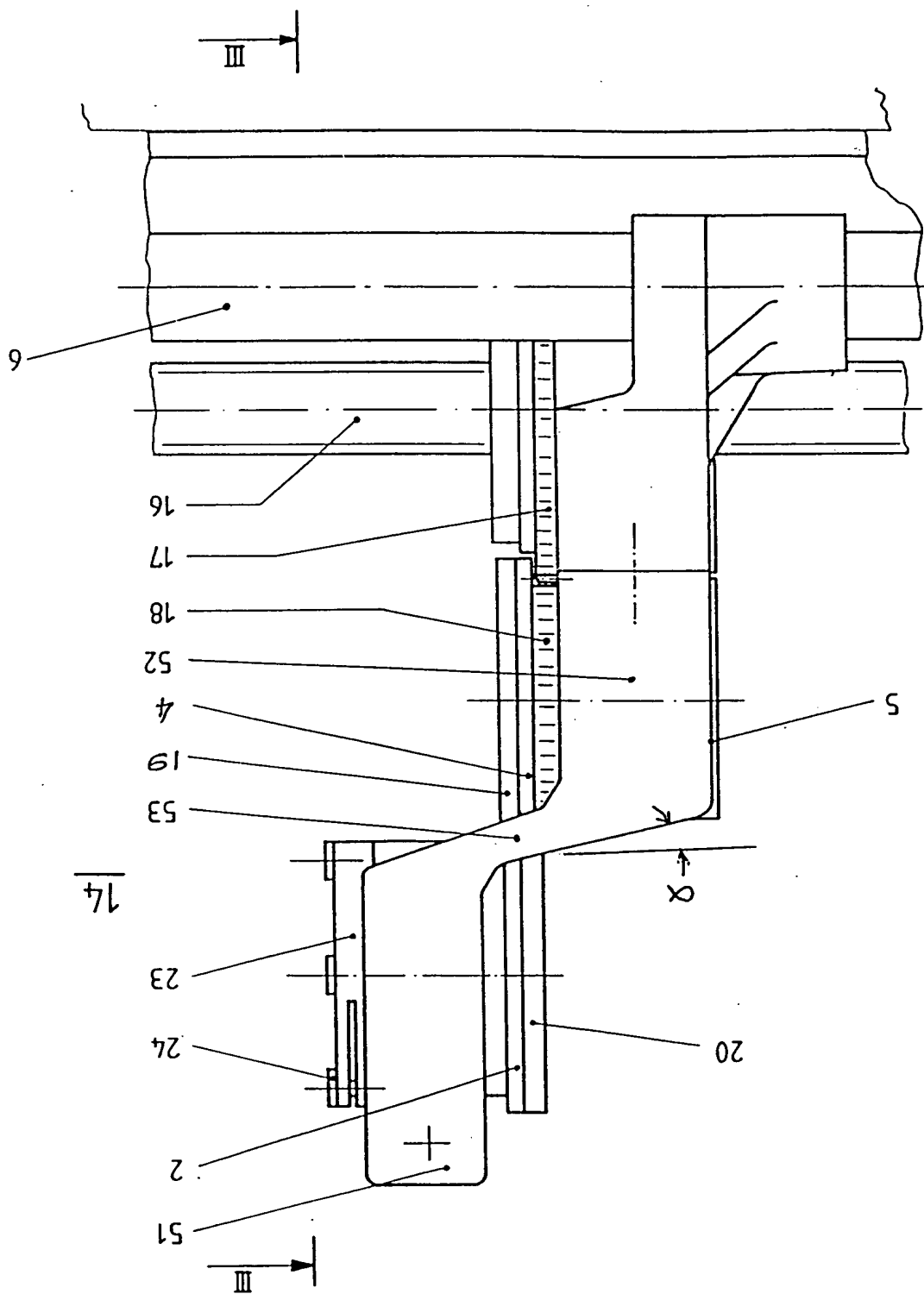
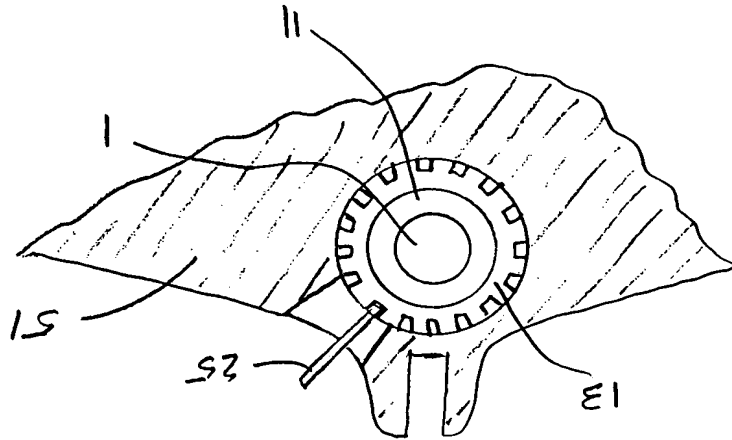


Fig. 1

Fig. 2



Proposed NEW FIGURE (IF REQUESTED
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ATTORNEY FOR APPLICANT

July 30, 1999
DATE OF SIGNATURE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of)

Rene Langhans)

) Group Art Unit: 3724

on ROTARY CUTTING UNIT)

Serial No.: 08/612,212)

Filed: March 6, 1996)

) (Our Docket No. 2821-18)

Hartford, Connecticut, July 30, 1999

BOX: Non-Fee Amendment
Hon. Assistant Secretary and Commissioner
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AMENDMENT

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Sir:

In response to the Office Action dated March 1, 1999, please amend the
above-identified application as follow:

In the Specification

Page 3, line 10, delete "non-positively".

Delete page 3, line 13 to page 4, line 21, and substitute the following new
paragraphs --One advantage achieved by the invention is that the circular blades are
easier to handle because the cutting gap between the two circular blades needs to be
set only once for the full-service life.

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Another advantage is that opportunity for damage to the cutting edges when adjusting or setting the circular blades is reduced because the cutting gap needs to be set only once. There is no relative displacement in either direction of the circular blades or of the blade shafts, and the circular blades remain fixed in place during their entire service life.

A third advantage is that conversion time is greatly reduced because the time-consuming setting and monitoring of the cutting gap is eliminated. Instead of one blade, a pair of blades can be positioned in one step. No relative displacement in either direction of the circular blades or of the blade shafts is required, and the cutter units are adjustable in a fully automated manner.

Yet another advantage of the invention is the increased availability and increased production output of the cutting unit due to the reduced conversion time, rapid exchange of worn cutter units, simple dismantling of worn parts because the blade shafts are not continuous, and the possibility of exchanging the worn parts and grinding the circular blades outside the cutting equipment.

Still another advantage of the invention is the increased production output due to the cutting unit which is serviced more easily and quickly.

Another advantage of the present invention is realized by the non-interlocking upper blade drive in each circular cutting unit which allows easy and quick exchange of circular blades with minimal operational interruptions.

A further advantage of the present invention is a constant, burr-free cut-edge quality which is obtained by using a constant cutting gap, reduced overlap of the circular blades, and strongly reduced shearing surface.

A still further advantage of the present invention is realized by the cutting unit frame which carries the pressure between the two blades and thereby reduces shaft loads and allows a small shaft diameter and circular blade diameter. The result is a steeper cutting angle, lower forces, and a neater cut edge. --

Page 6, line 24 - line 25, delete "a non-positive drive and is one which is".

Page 6, line 33, before "units" insert -- cutting--; after "for" insert -- the purpose of --; delete "be facilitated" and insert -- be provided --.

In the Claims

Claim 1

1. A circular cutter unit for cutting lengths of flat material comprising :

upper and lower circular blades lying in planes substantially perpendicular to [the] a plane defined by [of] the flat material and parallel with a longitudinal direction of the flat material;

upper and lower blade shafts respectively supporting said upper and lower circular blades, said shafts extending parallel with said plane of the material and perpendicular to said longitudinal direction;

a non-positive drive connection between said [blade] circular blades including a transport ring mounted for rotation with [one of the blades] the blade on one of the blade shafts and in driving [engagement] relationship with the blade on the other of the blade shafts;

a frame having substantially a U-shape when viewed in a direction perpendicular to the plane of the flat material with [the] upper and lower legs interconnected by a flat yoke intersecting said plane of the flat material at an acute angle,

means for rotatably supporting said upper and lower blade shafts respectively in said upper and lower legs;

means for establishing and adjusting a cutting gap between said two circular blades; and

means for releasably coupling one of the circular blades of said cutter

unit to a driving unit having a motor.

Claim 3 , line 2, after "the" insert -- circular -- and after "lower" insert -- circular--.

Claim 6, line 2, delete "(5)";

line 3, delete "(8)";

line 4, delete "(6)" and "(1, 3)".

Claim 7. (Amended) A circular cutter unit according to claim 6 wherein the means for rotatably supporting said upper blade shaft [(1) is supported in] includes an axially displaceable bush [(13)] mounted in said upper leg [(51)] of said frame [(5)].

Claim 8, line 1, delete "7" and insert --1--;

line 2, delete "(2, 4)".

Claim 10, line 2, after "lower" insert -- blade --;

line 3, delete "the nib" and substitute -- a nib --; after "overlapping" insert -- circular--.

Claim 11, line 2, delete "(1, 3)".

Claim 12, line 2, delete "(53)" and "(10)".

Claim 14, line 1, after "said" insert -- circular--.

Claim 15, line 2, after "lower" insert -- blade --.

Claim 16, line 2, delete "(1, 3)".

Claim 17, line 2, delete "(53)" and "(10)".

Claim 18, line 8, after "lower" insert -- circular --;

line 10, delete "non-positive" and insert -- frictional --;

line 13, delete "engagement" and insert -- relationship --;

line 22 - 23, delete "whereby each said cutter unit can be driven from said driving unit independently of each other cutting unit".

Claim 20, line 2, delete first occurrence of "cutting" and after "each" insert --circular--;

line 3, before "blades" insert -- circular --.

Claim 21, line 8, after "second" insert -- circular --;

line 14, delete "non-positively" and insert -- releasably --;

line 17, after "said" insert -- circular --.

Remarks

The claims presented for prosecution in this application are 1 - 3, 5 - 8, 10 - 12, and 14 - 21.

Priority

Examiner has maintained that priority has not been properly established in the current application. Examiner's attention is directed to the Preliminary Amendment dated November 20, 1997, wherein a claim for priority was expressly made on page 1.

Specification

The objections raised in paragraph 4 have been obviated by rewriting the advantages on pgs. 3 - 4 in complete and explanatory sentences. As discussed below, Fig. 2 has been amended to include acute angle α .

Drawings

The objections raised in paragraphs 5 - 7 of the Office Action have been obviated by amendments to the drawings where appropriate. Enclosed is a set of informal drawings which illustrate in red the reference to acute angle α in Fig. 2, and a reversal of the reference numerals 26 and 27 in Fig. 1 for consistency with Fig. 3. The drawings also indicate that the drive unit 30 is a detachable drive unit as described in the specification on page 6 at line 25.

Claim Rejections

In paragraph 10, claims 18 - 20 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time of the application was filed, had possession of the claimed invention.

Claim 18 has been amended to define a plurality of cutter units driven from a single driving unit. Language limiting the claim to "independently driven" cutter units had been removed and the claim is believed to be in condition for allowance. Likewise, claims 19 - 20 depend from claim 18 and are thus allowable.

In paragraph 11, claims 1 - 3, 5 - 8, 10 - 12, and 14 - 21 were rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make or use the invention.

Regarding reference to page 6, lines 24 - 33, the paragraph beginning with line 19 on page 6 has been amended to avoid further confusion regarding the drive shaft and drive unit by eliminating the "non-positive" reference which apparently is not synonymous with "detachable."

Regarding the Examiner's questions directed to the bush on p. 7, lines 11 - 21, a figure is enclosed to further clarify for Examiner the cooperation of the bush 13 with the pin wrench 25. If considered necessary by the Examiner, the enclosed figure can be added to the application, however, the figure is not considered necessary since it only shows the circumaxial slot for the pin wrench. Fig. 4 clearly shows how rotation of the threaded bush 13 relative to the slotted nut 23 using pin wrench 25 produces axial movement of the bush 13, bearing 11, and shaft 1 in the upper leg 51 of frame 5.

In reference to the Examiner's continued confusion about pg. 7 of the specification, line 29 to pg. 8, line 14, Applicant directs Examiner's attention to the table on page 8 and the discussion of prior art from page 1, line 15 to page 2, line 22. Certain measurements and values of features in the prior art are represented as a baseline of 100% in the table. The parameters are illustrated for comparison purposed in Figs. 5 (prior art) and 6 (present invention). The corresponding measurements or values in the present invention are given as a percentage of the baseline. For example, the blade overlap is 40% of the prior art overlap. Similarly, due to the smaller blade diameter and larger cutting angle, the cutting blades in the present invention spend 60% of the time used by the prior art to cut the same material thickness. Each parameter, other than cutting times, has a reference numeral in the table of page 8 corresponding to the parameter illustrated in Figs. 5 and 6. See specification p. 7, lines 29 - 32 and the references to Figs. 5 and 6 in the table on p. 8. The purpose of the table is to substantiate the improved cut-edge quality achieved by the invention as set out on p. 4, lines 12 - 21 of the specification.

Cutting angle was previously defined in the Amendment of November 20, 1997, page 9, lines 3 - 6 and is also illustrated in Figs. 5 and 6.

In stating "merely shows inherent results" of a smaller cutting unit, Examiner has oversimplified the significance of the present invention. Blade diameter, shaft diameter, cutting angle, and cutting force on the blade are related to each other. The prior art design requires thick shafts to apply the proper cutting forces, however the thick shafts require large blade diameters. Large blade diameters, in turn, reduce cutting angle, thereby requiring more cutting force and demanding larger shafts. The design of the present invention allows reduced shaft diameters which allow smaller blade diameters, thereby increasing cutting angle and reducing the forces required to cut material.

In paragraph 12, claims 1 - 3, 5 - 8, 10 - 12, and 14 - 21 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding paragraph 12(i), claims 1 and 10 have been amended to establish proper antecedent basis.

Regarding paragraph 12(ii), where the clarity of lines 9 - 11 of claim 1 is questioned, the language has been amended to clarify the relationship between the blade shafts, which was inadvertently omitted from the last amendment. As explained more clearly on p. 7 of the specification, the "non-positive drive connection" in one embodiment is accomplished by frictional engagement of the circular blades and transport rings.

Regarding the questions about the "means" language in claims 1 and 21, Examiner's attention is directed to page 6, lines 19 - 21 of the specification. A gear 17, best seen in Fig. 4, but also shown in Figs. 1 and 3, is disclosed as having a substantially square borehole 22 for square drive shaft 16, also shown in Fig. 1. Additionally, Fig. 1 has been amended to schematically illustrate the disconnectable

drive unit 30 that connects with square drive shaft 16. Gear 17 is slidable along shaft 16 to allow its cutter unit to be positioned and driven anywhere along the shaft, as well as to allow easy removal of the cutter unit from the end of the shaft when the drive unit 30 is disconnected. The coupling between the drive unit 30 and the square drive shaft 16 is not important and may take many forms, including splines or a simple slip coupling complimentary to the square shaft. Socket wrench sets are common examples of disconnectable square drives.

Referring to paragraph 12(iii), the clarity and scope of claim 6 is questioned. The claim is directed to the combination of a cutter unit and the recited means for mounting and positioning as discussed from page 5, line 32 to page 6, line 13. The rails 6 and bushings 26, 27 provide a means of mounting the frames 5, as well as positioning the cutter units "in the transverse direction 7 perpendicular to the longitudinal direction 8." Such a bushing and shaft configuration is known generally and further details have therefore been omitted.

Referring to paragraph 12(iv), claim 7 is identified by the Examiner as vague and indefinite. Applicant disagrees. Examiner's attention is directed to page 7, lines 11 - 21 that disclose a threaded displacement bush 13 that is rotatable in relation to the frame 5, thereby producing axial movement of the upper circular blade. A means for rotatably supporting (claim 1) does not encompass axial movement of the rotating axis. Claim 7 is directed to axial movement using an "axially displaceable bush," and the claim should be allowed.

Regarding paragraph 12(v), where the clarity of claim 10 is questioned, Examiner's attention is directed to the table and discussion on page 8 and Figs. 5 and 6 where the angle is illustrated by the tangents as previously explained. See Preliminary Amendment of November 20, 1997, page 9, lines 3 - 6. Claim 10 refers to the increased cutting angle disclosed in the table on page 8, which improves the quality of the cut edge. The cutter unit of the state of the art achieves a cutting angle

of only 5 degrees.

The cutting angle is directly related to blade diameter and the overlap of the blades. The more the blades overlap, the higher the angle between the flat material and the blades at initial contact. Reducing the overlap moves the tangents of the blades closer to the flat material. Therefore, with smaller blades, less overlap is needed to achieve a desired cutting angle, as seen in Figs. 5 and 6.

Referring to paragraph 12(vi), claim 18 is identified by the Examiner as vague and indefinite. The claim has been amended to include only a means for releasably coupling each cutter unit to a driving unit. The "means for releasably coupling" refers to the approximately square cross-section of drive shaft 16 and the cooperating borehole 22 discussed on page 6, lines 19 - 24.

Claim Rejections Based on Prior Art

Claims 1 - 3, 5 - 8, 10 - 12, and 14 - 21 were rejected under 35 U.S.C. §102(b) as being unpatentable over U.S. Pat. No. 4,116,098 to Suzuki et al. In order to support a rejection under §102(b), each element and limitation of the rejected claims must be found in a single reference, or a §102 rejection is improper.

Suzuki discloses a gang slitting machine having multiple cutter units 15A, 15B suspended between housings 183, 185 and supporting member 179, 181. An upper blade 17 is driven by an upper drive shaft 21, and a lower blade 19 is driven by a lower shaft 23. (See Suzuki, col. 3)


The present invention, on the other hand, utilizes a single drive shaft to drive the entire cutter unit. The drive shaft drives a lower gear which is attached to a lower blade and an associated transport ring. The upper blade and upper transport ring are driven by friction when a sheet is introduced between the lower, motor-driven blade/transport ring and the upper blade/transport ring. A very precise sheet metal cut is achieved in the present invention without driving the upper

blade, thereby making the cutter much simpler than Suzuki, which requires separate drive shafts for the upper and lower blades. Suzuki also does not have a flat, interconnecting yoke as in the present invention. Therefore, because each element of the present invention is not found in a single reference, the rejection under §102 should be withdrawn.

The Examiner cited Cox et al. as pertinent prior art. However, Cox fails to disclose the novel blade support and drive features of the present invention.

Accordingly and in the light of the discussion above, favorable consideration is requested. A clean set of claims 1 - 3, 5 - 8, 10 - 12, and 14 - 21 as amended are included herein for reference by the Examiner.

Respectfully submitted,

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Claim 1

1. A circular cutter unit for cutting lengths of flat material comprising :
upper and lower circular blades lying in planes substantially
perpendicular to a plane defined by the flat material and parallel with a longitudinal
direction of the flat material;

upper and lower blade shafts respectively supporting said upper and
lower circular blades, said shafts extending parallel with said plane of the material
and perpendicular to said longitudinal direction;

a non-positive drive connection between said circular blades including
a transport ring mounted for rotation with the blade on one of the blade shafts and
in driving relationship with the blade on the other of the blade shafts;

a frame having substantially a U-shape when viewed in a direction
perpendicular to the plane of the flat material with upper and lower legs
interconnected by a flat yoke intersecting said plane of the flat material at an acute
angle,

means for rotatably supporting said upper and lower blade shafts
respectively in said upper and lower legs;

means for establishing and adjusting a cutting gap between said two
circular blades; and

means for releasably coupling one of the circular blades of said cutter
unit to a driving unit having a motor.

Claim 2

A circular cutter unit according to claim 1 wherein said cutting gap is
adjusted to between about 0.005 mm and about 0.030 mm.

Claim 3

A circular cutter unit according to claim 1 wherein said means for releasably coupling one of the circular blades is coupled to said lower circular blade.

Claim 5

A circular cutter unit according to claim 1 wherein the transport ring of said non-positive drive connection between said blade shafts is in frictional driving engagement with the other of the blades.

Claim 6

A circular cutter unit according to claim 1 and further comprising means for displaceably mounting said frame for movement perpendicular to said longitudinal direction, said means for displaceably mounting including at least one guide rail extending parallel with said blade shafts.

Claim 7

A circular cutter unit according to claim 6 wherein the means for rotatably supporting said upper blade shaft includes an axially displaceable bush mounted in said upper leg of said frame.

Claim 8

A circular cutter unit according to claim 1 wherein said cutting gap between said two circular blades is adjusted to a range of 0.01 to 0.020 mm.

Claim 10

A circular cutter unit according to claim 1 wherein said upper and lower blade shafts support said circular blades in overlapping relationship at a cutting angle in a range of 6 to 8° at a nib of the overlapping circular blades.

Claim 11

A circular cutter unit according to claim 10 wherein each of said blade shafts has a diameter of less than 25 mm.

Claim 12

A circular cutter unit according to claim 11 wherein said acute angle at which said flat yoke intersects said horizontal plane is in a range of 8 to 12°.

Claim 14

A circular cutter unit according to claim 1 wherein said circular blades have cutting edges overlapping radially by a distance in a range of 0.18 to 0.23 mm.

Claim 15

A circular cutter unit according to claim 14 wherein said upper and lower blade shafts support said circular blades at a cutting angle in a range of 6.5 to 7.5°.

Claim 16

A circular cutter unit according to claim 15 wherein each of said blade shafts has a diameter of less than 20 mm.

Claim 17

A circular cutter unit according to claim 16 wherein said acute angle at which said flat yoke intersects said horizontal plane is in a range of 9 to 11°.

Claim 18

An apparatus for cutting flat lengths of sheet metal in a generally horizontal plane comprising:

a plurality of circular cutting units each including:

upper and lower circular blades lying in planes substantially perpendicular to the horizontal plane and parallel with a longitudinal direction in which the sheet metal is fed between the circular blades,

upper and lower blade shafts respectively supporting said upper and lower circular blades, said shafts extending parallel with said horizontal plane and perpendicular to said longitudinal direction,

a frictional drive connection between said blade shafts including a transport ring mounted respectively on each one of the upper and lower blade shafts adjacent the upper and lower circular blades respectively, and disposed in frictional driving relationship with the circular blade on the other of the upper and lower blade shafts;

a frame having substantially a U-shape when viewed from above the horizontal plane with upper and lower legs interconnected by a flat yoke intersecting said horizontal plane at an acute angle, and

means for rotatably supporting said upper and lower blade shafts respectively in said upper and lower legs, and means for establishing and adjusting a cutting gap between said two circular blades; and

means for releasably coupling each said cutter unit to a driving unit having a motor;

a plurality of parallel guide rails extending perpendicular to said longitudinal direction; and

means on each of said frames slidably engaging said guide rails so that each of said circular cutter units is independently positionable along said rails.

Claim 19

An apparatus according to claim 18 wherein said means for establishing and adjusting said gap sets said gap to a width between 0.005 mm and 0.030 mm.

Claim 20

An apparatus according to claim 18 wherein said circular cutting units are mounted on said guide rails with said circular blades of each circular cutting unit oriented in parallel relationship with the circular blades of the other cutting units.

Claim 21

A cutter unit for cutting flat lengths of material comprising:

a supporting unit;

a driving unit having a motor;

a cutter head releasably connected to said supporting unit, said cutter head comprising;

first and second circular blades having cutting edges;

first and second blade shafts respectively supporting said first and second circular blades in positions to cooperatively cut the material and to maintain a cutting gap between said cutting edges;

a frame having first and second legs and a yoke interconnecting said legs;

means for rotatably supporting said first and second blade shafts respectively in said first and second legs;

means for releasably connecting one of said two circular blades to said motor of said driving unit; and

means for transmitting drive motion provided by said driving unit to the other of said circular blades.